



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/GB90/00939 (22) International Filing Date: 18 June 1990 (18.06.90) (30) Priority data: 8913914.1 16 June 1989 (16.06.89) GB (71) Applicant (for all designated States except US): ELECTRICITY ASSOCIATION SERVICES LIMITED [GB/GB]; 30 Millbank, London SW1P 4RD (GB). (72) Inventors; and (75) Inventors/Applicants (for US only) : BLUNDY, Robert, W. [GB/GB]; Garmon Mill, Llanarmon, Nr. Mold, Clwyd (GB). JONES, William [GB/GB]; 10 Swn-y-Nant, Upper Bryn Clock, Mold, Clwyd (GB). (74) Agent: BOULT WADE &amp; TENNANT; 27 Furnival Street, London EC4A 1PQ (GB).</p>		<p>(81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent)*, DK (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent), US.  <b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>
<p>(54) Title: INFRA-RED RADIATION SOURCE</p> <div> </div>		
<p>(57) Abstract</p> <p>There is provided an infra-red radiation source which comprises a tube of infra-red radiation transparent material containing an electrical conductor formed of carbon fibres, which is connected across an electrical power supply. The tube is sealed and may either be evacuated or filled with a gas such as argon at sub-atmospheric pressure. This provides a radiation source with a fast response time, operable at temperatures up to 1200°C for example.</p>		

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INFRA-RED RADIATION SOURCE

This invention relates to an infra-red radiation source.

Infra-red radiation sources are used as heat sources in commercial process ovens, domestic cooker hot plates and ovens, and radiant energy electrical heaters, and there is a requirement for such sources which have a fast response time when energised, and which can operate at relatively high temperatures, for example up to 1200°C.

According to this invention there is provided an infra-red radiation source comprising a tube of infra-red radiation transparent material containing an electrical conductor formed of carbon fibres, and connection means for connecting the conductor across an electrical power supply.

This invention will now be described by way of example with reference to the drawing which is a diagrammatic perspective view of an infra-red radiation source according to the invention.

Referring to the drawing, the source comprises a tube 1 of infra-red radiation transparent material, for example a ceramic material such as quartz, which contains an electrical conductor 2 in the form of a flat strip formed of carbon fibres. At each end the strip 2 is terminated by a metal member 3 which is electrically connected by a coiled metal wire conductor 4 to connection means comprising a terminal member 5

which extends outside the tube 1. When the two terminal members 5 are connected across a suitable electrical power supply the source emits infra-red radiation.

The tube 1 is sealed and either is evacuated or contains a gas such as argon at sub-atmospheric pressure.

Otherwise an expansion chamber can be connected to the tube 1, the tube 1 and expansion chamber then together forming a sealed environment for the conductor 2 which is thus kept within its own reaction gases and inhibiting any further reaction.

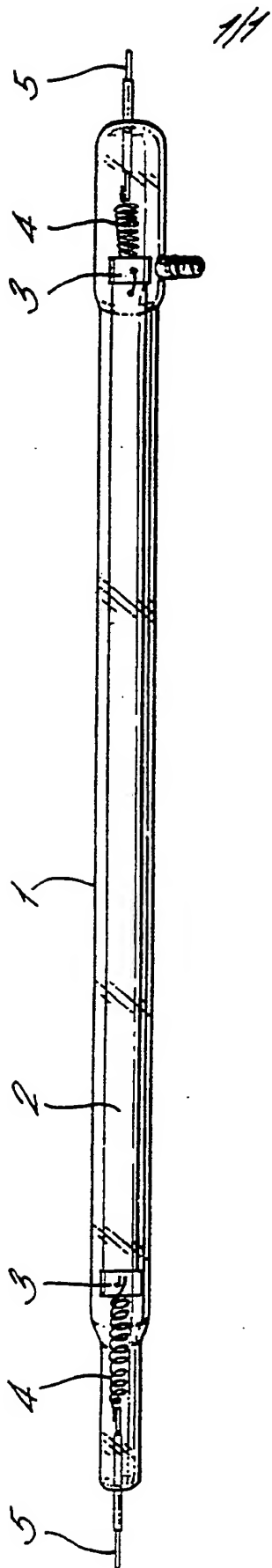
Although in the source described above the carbon fibre electrical conductor 2 is in the form of a flat strip, it will be appreciated that it can otherwise be of other cross-section, for example round or shaped. Further, it will also be appreciated that the metal wire conductor 4 need not be coiled.

CLAIMS

1. An infra-red radiation source comprising a tube of infra-red radiation transparent material containing an electrical conductor formed of carbon fibres, and connection means for connecting the conductor across an electrical power supply.
2. A source as claimed in Claim 1, in which the tube is sealed and evacuated.
3. A source as claimed in Claim 1, in which the tube is sealed and contains a gas at sub-atmospheric pressure.
4. A source as claimed in Claim 3, in which the gas is argon.
5. A source as claimed in Claim 1, in which the tube has an expansion chamber connected thereto, the tube and chamber together forming a sealed environment for the conductor.
6. A source as claimed in any preceding claim, in which the conductor is in the form of a flat strip.
7. A source as claimed in any preceding claim, in which the

tube is of ceramic material.

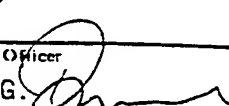
8. A source as claimed in Claim 7, in which the ceramic material is quartz.



## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 90/00939

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.CI. 5      H05B3/44 ;      H05B3/00		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.CI. 5	H05B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	SOVIET INVENTIONS ILLUSTRATED ACCESSION NUMBER 82-08945J, WEEK J50, 02 FEB. 83 DERWENT PUBLICATIONS LTD., LONDON GB. & SU-A-905918 (SEVERIN ET AL.) 15 FEB. 82	1, 6, 7
A	FR,A,1540750 (INSTITUT FÜR SCHIENENFAHRZEUGE) 27 September 1968 see page 2, right-hand column, lines 37 - 52; figure	1-3, 5, 7, 8
A	GB,A,966177 (GENERAL ELECTRIC COMPANY) 06 August 1964 see page 1, line 74 - page 2, line 2; figure 1	1-5, 7, 8
A	US,A,4543472 (ARAI ET AL.) 24 September 1985	
<p><sup>10</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"R" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
02 OCTOBER 1990	24. 10. 90	
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EUROPEAN PATENT OFFICE	RAUSCH R.G. 	

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ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.

pa/GB 90/0039

SA 37557

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02/10/90

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A-1540750		None	
GB-A-966177		None	
US-A-4543472	24-09-85	None	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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